

- b. a dopant region contained by the ridge;
- c. means facilitating application of an electric field through the layers, the electric field altering the refractive indices of the layers, the degree of alteration differing within a confinement region defined by the ridge, radiation generated within the emission layer being optically confined within the confinement region and emitted from a first edge of the emission layer;

Cmt B
wherein,

- d. the ridge comprises an elongated segment and a flared segment extending to the first edge, the flared segment comprising at least two opposed grooves in a surface thereof, the grooves suppressing only multimode radiation.

REMARKS

Claims 1-8 are pending in the Application. Claims 1-8 stand rejected.

In the Drawings

The Draftsperson's Notice of Patent Drawing Review that accompanied the Office action is acknowledged. However, as it pertains to the originally filed drawings and not to the formal versions submitted December 20, 2002, the objections are presumed to be moot.

Rejections under 35 U.S.C. §102

Claims 1 and 3-5 are rejected under 35 U.S.C. §102 as allegedly being anticipated by U.S. Patent No. 6,307,873 to Geels *et al.* ("Geels"). The Office action asserts on pages 2 and 3 that Geels discloses a diode laser comprising a plurality of semiconductor layers including a top layer with a ridge, a bottom layer, and an intermediate layer, a means for facilitating application of an electric field, the ridge comprising an elongated segment and a flared segment, and all the other stated limitations. Applicants respectfully traverse this rejection.

For anticipation under 35 U.S.C. §102, the cited reference must teach each and every aspect of the claimed invention either explicitly or implicitly. Any feature not directly taught must be inherently present. Claim 1 as amended recites:

A diode laser comprising:
a plurality of semiconductor layers including a top layer, a bottom layer,
and an intermediate emission layer, the top layer including a ridge...
a dopant region contained by the ridge;

means facilitating application of an electric field...

wherein the ridge comprises an elongated segment and a flared segment extending to the first edge, the flared segment comprising at least *two opposed grooves* in a surface thereof, *the grooves suppressing only multimode radiation.* (Emphasis added.)

In contrast, Geels teaches a multi-layer optoelectronic device including a pumping pattern of stripes, which are patterned to only partially pump the light beam as it exits from a single mode section and enters a diverging gain section. (Column 8, lines 13-17.) The pumping pattern of stripes provides an opportunity for the propagating beam to expand at a desired angle prior to saturated gain pumping to significantly increase the optical output beam. (Column 3, lines 47-50; and column 7, lines 58-65.)

Therefore, the *pumping pattern of stripes* suppresses laser gain, i.e., *suppresses both single mode and multimode laser radiation.* In contrast, the *opposed grooves* recited in claim 1 of the present application *suppress multimode radiation only.* Consequently, the opposed grooves of the claimed invention and Geels's pumping pattern of stripes, which are not opposed, differ both structurally and functionally.

Accordingly, Applicants respectfully submit that claim 1 is allowable under 35 U.S.C. §102 because Geels does not teach or suggest each and every aspect of the claimed invention. Furthermore, Applicants respectfully submit that claims 3-5 are allowable as depending from allowable base claim 1.

Rejection under 35 U.S.C. §103

Claims 2 and 6-8 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Geels. The Office action asserts on page 4 that Geels teaches all the limitation of claims 1 and 3-5, except the bottom layer having a dopant material in the same identical shape as the ridge and the number of grooves etched into the flared segment. The Office action further asserts that Geels teaches that the grooves and its pattern may have many other configurations that are realizable to meet the objectives of the Applicants' invention. Applicants respectfully traverse this rejection.

As recited above, Applicants respectfully submit that Geels does not teach or suggest all the recited limitations of independent claim 1. Accordingly, Applicants respectfully submit that claims 2 and 6-8 are allowable as depending from allowable base claim 1.

CONCLUSION

In view of the above remarks, Applicants submit that all claims are now allowable and respectfully requested withdrawal of the rejections. If the Examiner believes that a telephone conference with Applicants' attorney would be helpful, the Examiner is invited to contact the undersigned at the number below.

Respectfully submitted,



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MARKED-UP VERSION OF AMENDED CLAIM

1. (TWICE AMENDED) A diode laser comprising:

- a. a plurality of semiconductor layers including a top layer, a bottom layer, and an intermediate emission layer, the top layer including a ridge formed on a top surface thereof and extending to a first edge of the top layer, the layers each having a refractive index associated therewith, the refractive index of the emission layer differing from the refractive indices of the top and bottom layers;
- b. a dopant region contained by the ridge;
- c. means facilitating application of an electric field through the layers, the electric field altering the refractive indices of the layers, the degree of alteration differing within a confinement region defined by the ridge, radiation generated within the emission layer being optically confined within the confinement region and emitted from a first edge of the emission layer;

wherein

- d. the ridge comprises an elongated segment and a flared segment extending to the first edge, the flared segment comprising at least two opposed grooves in a surface thereof, the grooves suppressing only multimode radiation.